

# Hermite-Fejer polynomials as an approximate solution of singular integro-differential equations

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

---

## Abstract

© 2018, Springer International Publishing AG, part of Springer Nature. For full singular integro-differential equations with Gilbert kernel, the collocation method is justified. The approximate solution is sought in the form of Hermite-Fejer polynomial. The convergence of the method is proved and the rate of convergence is estimated.

[http://dx.doi.org/10.1007/978-3-319-75647-9\\_8](http://dx.doi.org/10.1007/978-3-319-75647-9_8)

---

## References

- [1] Lozinsky, S.M.: On the Fejer's interpolation process. Dokl. Math. 24(4), 318–321 (1939) (in Russian)
- [2] Zeel, E.O.: On trigonometric  $(0, p, q)$ -interpolation. Russ. Math. 3, 27–35 (1970). (in Russian)
- [3] Zeel, E.O.: On multiple trigonometric interpolation. Russ. Math. 3, 43–51 (1974). (in Russian)
- [4] Kish, O.: On trigonometric  $(0, r)$ -interpolation. Acta Math. Acad. Scient. Hung. 11(3–4), 243–276 (1960)
- [5] Sharma, A., Varma, A.K.: Trigonometric interpolation. Duke Math. J. 32(2), 341–357 (1965)
- [6] Varma, A.K.: Trigonometric interpolation. J. Math. Anal. Appl. 28(3), 652–659 (1969)
- [7] Salzer, H.E.: New formulas for trigonometric interpolation. J. Math Phys. 39(1), 83–96 (1960)
- [8] Gabdul Khaev, B.G.: Multiple nodes quadrature formulae for the singular integrals. Dokl. Math. 227(3), 531–534 (1976) (in Russian)
- [9] Soliev, Yu.: On the quadrature and cubature formulae for Cauchy kernel singular integrals. Russ. Math. 3, 108–122 (1977). (in Russian)
- [10] Soliev, Yu.: On interpolative multiple nodes cubature formulae for singular integrals. Russ. Math. 9, 122–126 (1977). (in Russian)
- [11] Gabdul Khaev, B.G.: Approximation in  $H$  spaces and applications. Dokl. Math. 223(6), 1293–1296 (1975) (in Russian)
- [12] Gabdul Khaev, B.G.: Finite-dimensional approximations of the singular integrals and direct methods for solving singular integral and integro-differential equations. In: Itogi nauki i tekhniki. Ser. matem. analys. 18, pp. 251–307. VINITI, Moscow (2002) (in Russian)
- [13] Gabdul Khaev, B.G.: Optimal Approximation of the Solutions Of Linear Problems. Kazan university publishing office, Kazan (1980)
- [14] Gakhov, F.D.: Boundary Value Problems. Pergamon Press, Oxford (1966)
- [15] Gabdul Khaev, B.G.: Some problems of the theory of approximate methods, IV. Russ. Math. 6, 15–23 (1971). (in Russian)
- [16] Gabdul Khaev, B.G.: Direct methods for solving some operator equations, I–IV. Russ. Math. 11, 33–44 (1971) (in Russian); Russ. Math. 12, 28–38 (1971) (in Russian); Russ. Math. 3, 18–31 (1971) (in Russian); Russ. Math. 4, 32–43 (1971) (in Russian)
- [17] Muskhelishvili, N.I.: Singular Integral Equations. Noordhoff, Groningen, Holland (1953)